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## EDITORIAL



## HOBBY???

IT is often advisable from time to time, no matter what walk of life we tread, to re-orient our thoughts in regard to our personal activities. In the matter of earning our livelihood we might give consideration to the future; concerning our leisure time, how we spend it.

The Radio Amateur, according to his code, is said to possess a hobby—a leisure time activity. However, when one consults with the Shorter Oxford Dictionary difficulty is experienced in making Amateur activities and portion of the definition coincide. The volume concerned considers that a hobby is "a favourite occupation or topic pursued for amusement" or in further delineation "an individual pursuit to which a person is unduly devoted".

Can we then say that our spare-time efforts are just "an individual pursuit"? Our financial outlay, our broad study, our thoughtful construction merely adds up to "a favourite occupation". What of the benefits the scientific and industrial organisations gain and will gain from our thoughtful observations? Just "a favourite occupation"?

To the general public perhaps, without an appreciation of what goes into Amateur Radio, the word hobby will suffice; but to those who

know and understand, it is extremely doubtful if this word can even touch on the multitudinous ramifications of our operations.

As members of this great worldwide fraternity, we should make it our business to let the public in general know that Radio Amateurs are people who carry out modest forms of radio research in that most searching field of all—"practical test"—that Radio Amateurs are 24-hour-a-day ambassadors spreading good-will to every corner of the globe. That Radio Amateurs are citizens who place their personal possessions—their radio equipment—at the disposal of the public as a whole when the necessity arises.

Maybe we are worthy of the word Amateur—"one who cultivates anything as a pastime"; but surely we can say our pursuits deserve better than hobby. Ours is more, much more than "a favourite occupation". It is an act of citizenship, of study, of research. We are operating in a field of especial significance. In keeping with this then let us be more than just a hobbyist. Let us be proud of the fact that we are engaged in Amateur experimentation as well as other activities, and that we can truthfully be described as Amateur Experimenters.

FEDERAL EXECUTIVE.

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# Two Mullard Tubes



## 2½" general purpose tube DG7-5 (CV2175)

The DG7-5 has a low operating voltage and is intended for symmetrical deflection. It is being successfully employed for wave form monitoring and for inexpensive oscilloscopes.

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# YOUR VISION AND TELEVISION

WILLIAM E. OWENS,\* F.V.O.A.

It is necessary in this short article for me to explain at once that this subject matter could be elaborated to a far greater extent than I propose. However, as it is necessary to condense a considerable amount of information within a small compass and in as simple a form as possible, I trust the more technically minded reader will overlook the approximations and over-simplification of some of the explanations.

My objects are:—

- (a) To attempt to help you in some of the optical and visual problems you will encounter in your work with television, and explain the reactions to television of the viewer;
- (b) To attempt to outline the visual background and application of television.

Now, a television set is primarily a box of electronics, and is truly a wonderful instrument, with all of its own technical problems. However, when the picture tube heats up and the image appears, it becomes at once also an optical and visual phenomena, and you enter an entirely different field of science.

The proof of what I have said is simple. Just close your eyes in front of your television set and instantly it becomes no more than a radio.



Fig. 1.—Like a Camera.

Our problem is divided into three parts:—

- (a) Light,
- (b) Optical,
- (c) Visual.

A full analysis shows that the following are the specific problems:—

- (1) The problem of the quality of the light emitted from the tube.
- (2) The quality of the image formed on the picture tube.
- (3) The relationship of movement of the images to the screen.
- (4) The problems of refractive errors in the human eye.
- (5) Flicker, viewing distance, viewing periods, and fatigue.

Generally speaking, the picture tube has a peak emission of light at 440 millimicrons (indigo), and again at 565 millimicrons (yellow-green). Now, yellow-green light agrees quite well with the maximum sensitivity of the human eye, and is useful light, but the indigo section (which represents 27% of the total light of the screen) has little visual

● At a recent general meeting of the Victorian Division of the W.I.A., Mr. Owens delivered a lecture on "Your Vision and Television." Upon request, Mr. Owens subsequently supplied "A.R." with the manuscript so that it could be published for the information of all members.—Ed.

use, and only affects the light adaptation of the eye. Hence the severe dazzle when the set is turned up too brightly, or when the screen is too bright in relation to the surrounding light in the room.

The image on the screen is an electronic image, not an optical one. For some hundreds of years scientists have been perfecting optical images, hence the high perfection of the optical instruments with which you are all familiar, that is, telescopes, field glasses, spectacles, etc. But the image on the picture tube is one that is formed by the impact of a stream of electrons on a fluorescing surface and is not a complete picture at any time, but a series of lines constantly appearing light and dark, according to the transmission. Indeed, the image is, in effect, not really there at all, but is only seen because of a phenomena of human vision called retinal retentivity. Because the eye retains the image it sees for a brief period (as is the case when you look at a bright light and look away), this factor permits you to see the picture as a continuous one. Remember also, a good deal of definition is lost when viewing movies shown on television because each process of photography and re-transmission causes some loss in definition.

One of the new skills that is required when viewing television is that of the appreciation of movement with the eyes kept quite still.

It is normal for the eyes to follow movement at a subconscious level, and this can be seen when you watch the flight of a tennis ball after it leaves the racket. The eyes are fitted with quick-acting muscles to enable this to be done, not only with one eye, but with both eyes locked together in high precision.

The reverse occurs when viewing a television screen, when the eyes must be kept almost motionless whilst the action of the flight of the ball, for instance, is covered by the television



Fig. 2.—Hyperopia (farsightedness).

camera. In the beginning, this reverse viewing of movement must be learned by the viewer, and can often cause symptoms of vertigo, etc., until it has been mastered.

The human eye is very similar in its optical system to that of a camera, and for those people who know photography, it can be said to work at approximately a N.A. of F 4.5. Like a camera, the eye has a lens behind the pupil, and is normally focused for infinity, and objects from 20 ft. onwards require no additional focusing of the eye. However, the eye, like the camera (Fig. 1), has to have its focus altered for distances closer than 20 ft., and whereas this is accomplished in the camera by altering the lens position, the human eye alters its lens shape by means of an internal muscle and sus-

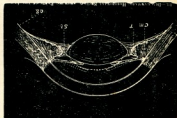


Fig. 2a.—Accommodation.

pensory fibres. The presence of a blurred image on the retina or light-sensitive area of the human eye, will stimulate this focusing, causing the lens to be made more convex and adjust the eye to focus objects at the required distance. This is done with a fair degree of precision. Many of you are aware that a good quality camera needs a miniature range finder built into it to obtain the high degree of precision in its focus.

The optical defects of the human eye may be considered, for the purpose of this article, to be anatomical or axial; that is, the eye-ball is too short for its focus—commonly called Long Sight (Fig. 2). The eye-ball may be too long—called Myopia or Short Sight (Fig. 3); or the front of the eye, called the Cornea, may not be spherical—thus causing double focus or Astigmatism (Fig. 4).

These defects affect either the clarity of the images seen by the patient or the degree of effort (eyestrain) required to achieve clear vision.

The long-sighted person usually sees clearly if the defect is not too great, but suffers from headaches, squinting eyes, fatigue and nervous disorders, and irritation from light.

The short-sighted person just doesn't see clearly at all unless objects are close. They, too, tend to screw up their eyelids and are noticeably slow in identifying distant objects.

Those with Astigmatism usually suffer most and combine many of the symptoms of the other two defects.

\* Director of Andrew Gaddes Pty. Ltd., Optometrists and Spectacle Makers, 157 Elizabeth St., Melbourne, C.I., Vic.

It should be obvious, therefore, that if the viewer has a television set which is accurately focused and with proper background lighting, and sitting at a reasonable distance, yet, in spite of this, has sore eyes, headaches or blurred or double vision, then the problem is due to optical errors in the human eye, and they should seek professional advice at once.

Television does not in itself cause eyestrain when properly used and viewed, but does seek out unerringly those persons whose vision, for one of several reasons indicated, is not normal.

I have referred to the words **retinal retentivity** whereby the eye retains its image. Now, a light must flash on and off between 16 to 50 flashes per second (varying with the individual) for this flashing light to be seen continuously. Movies operate at about 48 flashes per second; but in television, the picture is changing **all over the screen all of the time**, and any given point on the screen rises and falls in brightness about thirty times per second. If you look away from the television screen, it is possible to see this flickering of the image out of the corner of the eye. So it is quite normal for this phenomena to be observed in this manner should it be reported to you by viewers. However, if the tube illumination is too intense, then the flicker phenomena increases due to the nerve relays in the retina.

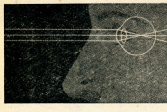


Fig. 3.—Myopia (nearsightedness).

#### SOME HINTS IN T.V. VIEWING

The viewing distance of a television set should be roughly six to seven times the height of the screen, and viewing it at too great a distance may make certain portions of the picture too small for visual appreciation, and viewing it too closely calls for excess focus of the eye plus muscular convergence of the two eyes, and will cause fatigue.

One thing that must be clearly in the minds of all viewers is the duration of the viewing periods, and it is amazing just how much time does elapse when one sits down comfortably in front of this electronic visual wonder for a night's enjoyment. Two, three or four hours' continuous viewing occur almost without the viewer being conscious of the passage of time, and so one must expect that visual fatigue can follow **too much viewing for too long a period**, just the same as over exertion in any field of function will give the same results.

Children should be rationed in a commonsense manner in their viewing periods, and although at first the fascination of these little figures so life-like, and so interesting, may cause them to sit abnormally close, to the

extent that the cover glass is usually covered with tiny finger prints, yet, when that novelty has worn off, they should be seated at a specific distance along with the adults.

The lighting in the room should be not as bright as the screen, and yet not so dull that the screen glares out of a dull contrast. Remember that the light is being transmitted through the tube to you, and not reflected from a screen as in the case of movies, which is the fundamental reason why movies are seen better in a completely darkened room, and television is not.

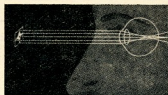


Fig. 4.—Astigmatism.

There is a wide variation in the degree of contrast between the room illumination and the picture tube, and commonsense is a great help in treating this problem. Usually floor lamps, such as your standard lamp, or one or other of the specially built television lamps will be a great help, and they should be so arranged that they are out of the way of your own line of vision, do not reflect in the cover glass of the television screen, and yet illuminate softly the wall immediately behind the television set.

Always allow a short period for the eyes to become dark adapted, after watching a television screen for a long period, before you get in your car to drive home on a dark night.

Do not resist unwisely the wearing of glasses when they are ordered for you, or other advice given by your professional advisers.

Keep your set illumination to a minimum, and make sure that the installation of the set is correct so as to give you the best possible picture image.

The immense number of television sets already sold in Melbourne and Sydney, and the enormous number of licenses being issued each week, are an indication as to how this new medium will alter our lives and our eye habits.

The writer, who saw television in England and America in 1948 and again in 1955, was staggered at the tremendous increase that was apparent in the number of viewers, both in the old world and in the new.

Already in Melbourne and Sydney, television dealers have had brought to their notice in no uncertain manner the visual problems of this new media, and in Chicago it was the writer's privilege to take special lectures that had been prepared, so as to be ready for the problems to be met with in this new field.

Here in Australia, we are seeing a good form of television, equal fully to that viewed abroad, but yet we are only touching the fringes of the appli-

cation of television in one form or the other as it will come to pass in a very few years.

Already, closed circuit television is a wonderful field in education, in surgical demonstrations and many other fields. It is used extensively by banks, by engineering projects, in underwater photography, and now the eye professions are making use of television to train children with retarded vision or poor eye co-ordination.

In conclusion, I may say that your eye men are quite as deeply involved in the visual aspects of television as you are in the electronics, and it is necessary for both to know some of each other's problems in their respective fields, and I hope that this short discussion on vision may be of some help to you all.

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# Series Phased Array, Mark ?

COLIN A. MACKENZIE,\* VK3ACM

IN its original form (Fig. 1) this antenna was known as a Marconi-Franklin Series Phased Aerial. As its name implies, it was a product of the Marconi Company and was first fully described in 1933. It is an end-on or end-fire array, having uni-directional characteristics.

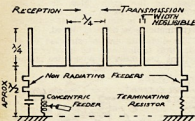


FIG. 1

MARCONI FRANKLIN SERIES PHASED AERIAL.

The next development was described briefly in "QST", Dec. 1945, p. 62-63, "The World Above 50 Mc" by E. P. Tilton, WHDG. The information was given to A.R.R.L. Headquarters by an anonymous foreign Amateur. This development consisted of adding the lower half or image, as shown in Fig. 2.

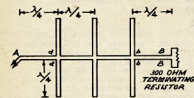


FIG. 2

IT IS POINTED OUT IN QST THAT  $\frac{1}{2}$  SECTION BA MAY BE ELIMINATED. AND IF FEED LINE TO TRANSMITTER IS 300 OHMS. SECTION A & B MAY ALSO BE DISPENSED WITH.

Exactly the same arrangement was later described in "Amateur Radio", May 1948, p. 3, "Series Phased Aerial Arrays" by H. K. Love, VK3KLU.

The next we hear of this type of aerial is again in "Amateur Radio", Jan. 1950, p. 14, "The Lenfo Series

Phased Array" by Len Jackson and C. Gibson, VK3FO (Fig. 3).

It is in this form that, I think, there would be most interest. It should give high gain, good back-to-front ratio, wide bandwidth, be easy to feed, and require no critical adjustments.

However, from various sources disappointing results have been reported, even after following carefully the design procedure recommended. Now unfortunately the writer, not being in a position, because of lack of equipment, to carry out the necessary measurements, has, after much thought and waste paper, decided the easiest way is to throw the problem to the wolves, so to speak, in the hope that some mathematical genius in conjunction with some experimental wizards, will take up the challenge and thrash the problem to bits and come up with all the answers.

Here are the problems:

- (1) What is the correct value of propagation constant "K" to use in the design of the elements?
- (2) What effect does the spacing of the conductors in the loops have on their resonant length?
- (3) What effect on the performance does the use of 300 ohm twin ribbon quarterwave sections have?

## MARCONI-FRANKLIN

To understand the problem more clearly we must first take a look at the basic theory of the Marconi-Franklin series phased aerial shown diagrammatically in Fig. 4 (a).

In the example five loops are used. This number can be increased or decreased, depending on the gain and beam width required, or, of course, for Amateur use, the space available to erect the beast.

Considering its action as a transmitter, travelling waves are fed via a non-radiating feeder to the point A from whence they travel along the aerial to point O. Then by another non-radiating feeder to the terminating resistor which has a value equal to the impedance of the system. This resistor absorbs any residual energy not radiated. It has been found that this resistor can be dispensed with when the length of the aerial amounts to about four wavelengths. Under these conditions the travelling wave energy is wholly dissipated.

The dotted curves in Fig. 4 (a) represent a travelling current wave at an instant of time, assuming no attenuation losses. This travelling wave is also represented in Fig. 4 (b).

The two conductors comprising each loop are made close enough in space, so that, as regards radiation, they may be considered as coincident, and

therefore replaceable by a single wire on which there are two waves of equal amplitude travelling in opposite directions. **Stationary or standing waves** will therefore be set up. ("Lenfo" please take note. If there were no standing waves how would it work?) The nodes of which are situated at the points B, E, H, K and N, since at these points there will always be two equal currents flowing in opposite directions. Each loop will therefore radiate in the same way as a single quarter wavelength aerial carrying a stationary wave.

The direction of the arrows in Fig. 4 (a) and (b) show that the loops in the aerial array are not radiating in the same phase at the same instant of time.

Fig. 4 (c) and (d) show the relative phase of each of the loops, the vectors of Fig. 4 (c) indicating a progressive phase difference of  $90^\circ$  between successive loops. At the instant of maximum radiation, i.e. that chosen for the diagram, it will be seen that only each alternate loop DEF and JKL is radiating; the current in DEF leads that in ABC by  $90^\circ$ , and so on down the array

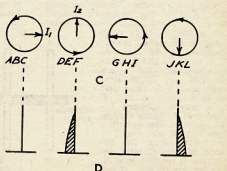
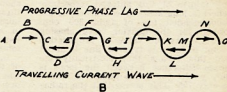
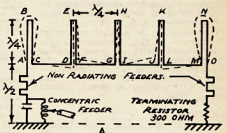


FIG. 4

\* Ballendella, via Rochester, Vic.

from the end A. (It should be noted that a lag of 270° is electrically equivalent to a lead of 90°.)

Although each loop is equivalent to a quarter wave aerial, there is one important difference, it can be shown that the effective radiation current is doubled, thereby increasing the radiating resistance four times. As the loops of the array are spaced a quarter wavelength apart and have equal currents in each, but with a phase difference of 90° between adjacent loops, the phase lagging progressively from A to M, we have the required conditions for an end-on or end-fire array, with reinforcement taking place in the direction from M to A.

Considering vector  $I_1$ . It represents a loop radiating a wave 90° ahead of  $I_1$ ; since it is spaced by a quarter wavelength from the loop represented by  $I_1$ , its effect at that point will be equivalent to a wave arriving in phase. This reinforcement in the forward direction between the loops corresponding to vectors  $I_1$  and  $I_2$  is represented by rotating the latter backwards through 90°.

In the opposite direction, i.e. from A to M, since the radiation from the equivalent loop ABC starts with a lag of 90°, it will be lagging by another 90° and will therefore arrive exactly in anti-phase and so the two will cancel. From this it can be seen that the radiation from successive loops cancel in the backward direction. Therefore to obtain maximum back-to-front ratio an even number of loops should be used in the array—2, 4, 6, 8, etc.

The foregoing is a brief outline of the theory of the Marconi-Franklin series phased aerial. A more detailed and mathematical analysis can be obtained by consulting "Short Wave Wireless Communication," Ladner and Stoner (John Wiley & Sons), second edition, 1934.

## "Lenfo"

Now let us take a look at the "Lenfo." One of the main contributing factors to the failure of this antenna, especially where a long array is concerned, is the recommended use of twin 300 ohm ribbon for the quarter wave phasing sections. As the value of propagation factor K for this type of line is about 0.8; this means that electrically the phase difference between the loops is 90°, whilst the phase phase difference is only 72°. This means that the radiation from successive loops is not in the correct phase relationship for maximum gain. Also in the backward direction the phase relationship causes a reduction in back-to-front ratio.

Fig. 5 shows a "Lenfo" consisting of six elements A, B, C, D, E, and F spaced electrically 90° apart, but with only 72° physical separation. It is clear that the radiation from loop F as it travels forward toward loop A, firstly arrives 18° ahead of the radiation from loop E, 36° ahead of that from loop D, 54° ahead of loop C, and, by the time it reaches loop A, it is leading by 90°. If the number of loops in the array were increased to 11,

the radiation from the rear or terminating loop would arrive 180° out of phase with the radiation from the leading or fed loop and the two would cancel each other.

In the backward direction, instead of each successive pair of loops cancelling, we would have a considerable amount of rear radiation, hence a poor back-to-front ratio. It is therefore essential that the space and electrical phase difference between successive loops be the same, or as close as possible. It should also be noted here that maximum gain is obtained from end-fire arrays for spacings between successive elements of between a quarter and three-eighths wavelengths when those successive elements are 90° electrically apart. This becomes more important as the array length is increased (see Terman "Radio Engineer's Handbook," p. 802, Fig. 36).

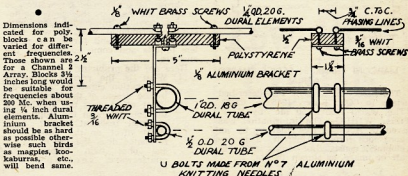


FIG. 6

An air spaced phasing line can easily be constructed using a minimum of insulating material that will have a propagation constant K of at least 0.98. Using such a line, the difference between successive loops will be less than 2° and could be neglected.

It is also important that in phased arrays the dimensions of the elements should be correct so that phase relations throughout the whole array are maintained. As the elements of this type of array can be supported at current loops, the end effect can be kept to a minimum.

In the "Lenfo" article a value for K of 0.9 for the design of the elements was suggested as being the correct figure to use. It is the writer's opinion that for the element design a value of K at least 0.95 should be used. The actual value will depend on the size of the conductors used. Just what effect

the close spacing, about  $\frac{3}{4}$ " centre to centre, has on the resonant length would have to be determined experimentally.

The folded dipole terminating element would be designed in the usual manner adopted for these elements.

Series phase arrays, either in their original or modified form, are suitable for both vertical or horizontal polarisation.

The writer has a 4 element "Lenfo" modified as outlined, operating on Channel 2 and quite good results have been obtained at this location—100 miles, as the crow flies, from Mt. Dandenong. However, due to lack of equipment it is not known if optimum performance has been achieved.

The elements are constructed of 1" o.d. dural tubing and the quarter wave sections use 0.104" copper wire spaced

41/64" centre to centre. Aluminium wire of a suitable size and spacing for 300 ohms impedance would save a lot of weight. For any other size of conductor used in the 300 ohm quarter wave lines, correct centre to centre spacing can be obtained simply by multiplying the conductor diameter by 6.2. But for reasons that will be pointed out later, a conductor size that will give large spacing should be avoided, also close spacing of small diameter conductors will usually require more spacers and these of course will lower the value of K.

The usual method of mounting the elements of such an array is to use a wide wooden boom and support the elements on stand-off insulators. This is both heavy and has quite a large wind resistance. The array at this location uses twin dural tubes for the boom, arranged as shown in Fig. 6.

The use of twin tubes is to prevent sag. The same effect could be obtained by using bracing tubes at an angle between the boom and the mast. However, the array would be more difficult to handle before mounting.

The separation between the quarter wave line sections on the top of the boom is about  $2\frac{1}{2}$ ", and the lines are mounted symmetrically so that they are balanced to ground. The separation of  $2\frac{1}{2}$ " is ample as it represents about four times the centre to centre spacing of the line. It has been found that when the separation between a flat shield is equal to the centre to centre spacing of the line, the characteristic impedance is only lowered about 25 ohms, so in

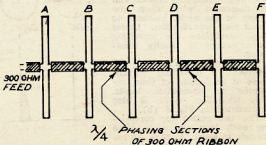


FIG. 5



the above case any reduction could be neglected. The propagation constant K and therefore the length of the line is not altered by the presence of the metallic boom, even when the spacing is equal to the centre to centre spacing; this is because as the distributed cap-

Finally, the centre of the folded dipole may be earthed as the whole array is balanced to earth. The writer used the method shown in Fig. 8. Well, that's the story as far as I can take it. So who is willing to carry on from here?

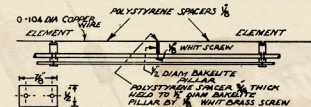


FIG 7

SUPPORT FOR PHASING LINES

acity is increased, the inductance is reduced due to eddy currents induced in the boom. As the propagation constant is determined by the product of inductance and capacity, and as this product remains constant, so the value of K is constant. (See "Principles of Radar" by M.I.T. Radar School, second edition, chapter vii. p. 7-9 and 7-10 [McGraw-Hill Book Company].)

When a wooden boom is used and the quarter wave sections are mounted close to it, both the propagation constant K and the impedance will be made lower because of the added capacity due to the dielectric constant of the wooden boom. Also the dielectric constant of the wooden boom will vary with the weather.

The quarter wave lines are supported as shown in Fig. 7.

### APPENDIX

Formulae recommended by the writer:—

- (1) For length round each half loop:

$$\frac{492 \times 0.95}{\text{Freq. Mc.}} \text{ feet}$$

- (2) For length of quarter wave phasing lines:

$$\frac{246 \times 0.98}{\text{Freq. Mc.}} \text{ feet}$$

- (3) For folded dipole. Length around complete loop:

$$\frac{984 \times 0.95}{\text{Freq. Mc.}} \text{ feet}$$

Centre to centre spacing of conductors comprising the folded dipole about 3".

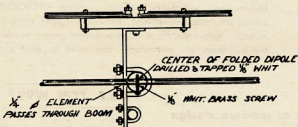


FIG 8

It will be noticed here that the plane of the conductors is vertical whereas in the other elements it is horizontal.

### PREDICTION CHART, FEB. '59

Me. E. AUSTRALIA	W. EUROPE S.R.	Me.
0 2 4 6 8 10 12 14 16 18 20 22 24	GMT	0 2 4 6 8 10 12 14 16 18 20 22 24
45	---	45
28	---	28
21	---	21
14	---	14
7	---	7

E. AUSTRALIA — W. EUROPE L.R.	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — MEDITERRANEAN	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — N.W. U.S.A.	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — N.E. U.S.A. S.R.	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — N.E. U.S.A. L.R.	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — CENTRAL AMERICA	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — S. AFRICA	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

E. AUSTRALIA — FAR EAST	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

W. AUSTRALIA — W. EUROPE	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

W. AUSTRALIA — N.W. U.S.A.	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

W. AUSTRALIA — N.E. U.S.A.	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

W. AUSTRALIA — S. AFRICA	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

W. AUSTRALIA — FAR EAST	
0 2 4 6 8 10 12 14 16 18 20 22 24	
45	---
28	---
21	---
14	---
7	---

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# Adjustment Procedures for VHF Converters

## Hints on Attaining Optimum Performance with Simple Test Equipment

EUGENE C. FRYE, K0DJP

**M**ANY newcomers to the Amateur v.h.f. field feel well able to build and wire their own converters. Most designs are simple enough, mechanically and electrically, but adjustment for peak performance is quite another matter. This article describes test procedures that can be carried through with only the simpler items of test equipment. The material presented is sufficiently general to be applicable to most v.h.f. converters described today.

Anyone who intends to build or even repair and adjust his own gear should have some test equipment. The items recommended here are not of the complex or expensive variety. They should be a part of the station equipment; as necessary as the transmitter, receiver or antenna system. First we need some form of test meter, either vacuum-tube voltmeter or volt-ohmmeter. The v.t.v.m. is preferable, as it is more versatile, but the latter will do if its meter is the sensitive 20,000 ohms-per-volt type. A grid-dip meter (g.d.o.) is a must for determining the resonant frequency of tuned circuits. A noise generator is a necessity for receiver work. The crystal-diode variety<sup>1</sup> is so simple and inexpensive that it is foolhardy to try to do without one. Let's see how these tools are used.

### LOCAL OSCILLATOR ADJUSTMENTS

If you have not already done so, it will facilitate converter adjustment procedure if you install a "looker point" in the grid circuit of the mixer stage. This can be a 1 megohm resistor connected between the mixer grid and a test jack or feed-through pin, as shown in Fig. 1. This point should be accessible from the top of the chassis. The d.c. voltage read here will be useful for setting the oscillator injection level and for alignment of the r.f. stages. Following initial alignment, subsequent checks can be made conveniently at this point without removing the converter bottom plate or other shielding.

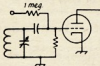


Fig. 1.—A test point for measuring injection level is a great convenience in making converter adjustments. D.c. voltage may be read with vacuum-tube voltmeter or sensitive volt-ohmmeter.

Before proceeding with actual alignment it is a good idea to adjust all tuned circuits approximately to the desired resonant frequencies with the grid dip meter. This can be done with the converter inoperative, but with the heaters on.

The next step should be to get the oscillator working properly. If it is a tunable oscillator its frequency range should be checked and the dial calibrated roughly. If it is a crystal oscillator be sure that the frequency is right, and that it is controlled by the crystal. This can be done by listening to the oscillator note in a communications receiver. The frequency should vary only slightly, if at all, when the oscillator is tuned, or when a metallic object is placed near the tuned circuit. If the crystal frequency is out of range of the receiver this check will have to wait until the mixer is put into operation. Then a locally generated signal can be tuned in for the stability check. This signal could be from the transmitter exciter or other stable source. Some grid-dip oscillators are sufficiently stable for this purpose.

If the converter oscillator is not stable it is usually because of too much feedback. If no oscillation develops the feedback is too low, assuming, of course, that the crystal is in working condition. Most converter oscillators use overtone crystals or oscillator circuits that are intended to make the crystal work on one of its overtones. Overtone oscillator feedback adjustments have been discussed thoroughly in "QST".<sup>2</sup>

If the converter has one or more multiplier stages following the crystal oscillator, these should now be checked to see that they are on the desired frequency. Use the g.d.o. as a wavemeter for the multiplier stages. The circuit may be peaked for maximum output with the g.d.o. as an indicator, though the d.c. voltage at the mixer test point is the best indication, once it is determined that the stages are on the desired frequencies. Coupling from the oscillator is usually adjusted to give about minus 2 to 3 volts injection bias at the mixer grid, as measured with a v.t.v.m.

### R.F. AMPLIFIER RESPONSE

Once the injection level is set, the response of the r.f. stage or stages can be set up using the g.d.o. as a signal generator and the mixer test point as a signal detector. The g.d.o. can be connected to the antenna input terminal through a piece of transmission line about a half wavelength long. This can be co-ax or twin-lead, depending on the converter input circuit design. At the g.d.o. end of the line there should be a small pick-up loop, loaded with a half-watt carbon resistor of approximately the value of the line impedance. The loop can be made from the resistor leads, in fact.

Set the g.d.o. at approximately the middle of the desired converter operating range. Remove plate voltage from the converter oscillator and multiplier stages, so that only the voltage developed at the mixer grid by the amplified signal from the g.d.o. will be read.

Couple the loop to the g.d.o. coil and adjust its position so that minus 1 to 2 volts is read at the test point. Tune the r.f. circuits for the desired pass-band characteristics.

### R.F. OSCILLATION CHECKS

Before making final adjustments, check for oscillation in the r.f. stages. A simple test is to remove plate voltage from the oscillator and from the r.f. tube immediately preceding the mixer. Read the negative contact potential at the test point. Now apply the plate voltage to the r.f. stage again, but leave the oscillator disabled and the g.d.o. off. If the reading goes more negative when the r.f. stages are working, oscillation is present in the r.f. portion of the converter.

Elimination of r.f. oscillation can sometimes be quite a problem. If the r.f. amplifier is a cascode, it must first be determined which part of the amplifier is oscillating. A quick check on this is to read the amplifier plate current, and note if it changes as any circuit is tuned, or touched again, but leave the oscillator disabled and the g.d.o. off. If the reading goes more negative when the r.f. stages are working, oscillation is present in the r.f. portion of the converter.

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### ADJUSTING DOUBLE-TUNED CIRCUITS

R.f. bandpass adjustments may now be made. For this, be sure to set the signal level below the saturation point, as observed at the test point. Many current converter designs use double-tuned circuits, as they provide better attenuation of signals from outside the desired pass-band than single-tuned circuits. Unfortunately, they are notoriously difficult to align properly, unless a sweep generator and oscilloscope are available. The procedures outlined below will give satisfactory results without these expensive tools.

The simplest way of using an ordinary signal generator (or your g.d.o.) is

<sup>1</sup> Reprinted from "QST", October 1959.  
<sup>2</sup> Tilton, "Noise Generator—Uses and Limitations", "QST", July 1953, p. 10.

<sup>2</sup> Tilton, "Overtone Crystals—How and Where to Use Them", "QST", March 1955, p. 16.

# ★ The **WARBURTON FRANKI** Page

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2N414	.. 41/3		

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### DIODES

OA70	.. 5/3	GEX35	.. 5/8
OA79	.. 6/3	GEX45	.. 12/11
OA81	.. 8/7	GEX54	.. 12/11
OA85	.. 7/11	GEX55	.. 22/7
GEX09	.. 4/1		

(All above post 3½d. ea.)

### Transistor Transistors

#### ROLA

TR7 Output 420/2.5 ohm	.. 18/0
TR8 Output 200/2.5 ohm	.. 18/0
DR4 Driver 3000/1330 ohm	.. 18/0
TR18 Output 375/3.5 ohm	.. 21/0
DR17 Driver 3000/2000 ohm	.. 21/0
TR27 Output 450/15 ohm	.. 23/8
DR27 Driver 4000/2000 ohm	.. 23/5

#### FERGUSON

TRD107 Driver 3000/1300 ohm	.. 20/6
TRD108 Driver 3000/2000 ohm	.. 20/6
TRD107 Output 430/3.5 ohm	.. 20/6
TRD108 Output 300/3.5 ohm	.. 20/6
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the damping method. Set the signal generator or g.d.o. at the middle of the desired pass-band. Load one of the double-tuned circuits by connecting a carbon resistor of about 1000 ohms directly across it. The voltage read at the test point will drop considerably, and it may be necessary to increase the coupling to the signal source to provide a usable indication. Tune the other circuit for maximum indication at the test point. Remove the damping resistor and check the shape of the response curve by varying the signal generator across the converter tuning range and noting the voltage at the test point. It should resemble the curve of Fig. 2.

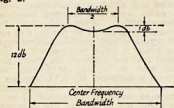


Fig. 2—Typical response curve of a converter using double-tuned circuits. Essentially flat top and steep sides are desirable characteristics.

The chances are that the desired pass-band shape and bandwidth will not be realised with the first adjustment. In general, increasing the coupling while maintaining constant circuit  $Q$  will increase the bandwidth and also make the "horns" at the edges of the pass-band sharper. Increasing the loaded  $Q$  of one or both of the tuned circuits will increase the sharpness and height of the horns without materially affecting their frequencies. The loaded  $Q$  of the tuned circuits can be changed by varying the  $L/C$  ratio at the desired frequency. With constant loading, decreasing the capacitance and increasing the inductance will result in lower loaded  $Q$ , and vice-versa. Damping resistors can be used across the coils, if the minimum usable circuit capacitance results in too high a loaded  $Q$  (too narrow a passband).

Because changes in coupling or loading will often change the tuning of the circuits, it is a good idea to re-tune them after every adjustment of the coupling. It will also be found that coupling and  $Q$  adjustments are interacting. Should the passband shape tend to be tilted badly after adjustment by the damping method, it is an indication either that regeneration is present or that there is undesired coupling between the two tuned circuits. If the ratio of bandwidth to centre frequency is over 10 per cent., one of the stages will probably have to be detuned slightly to eliminate tilt in the slope of the passband.

An alternative procedure for aligning double-tuned circuits is to detune one circuit considerably, tune the second to maximum response, damp the second, and tune the first to maximum. Remove the damping resistor when this is completed.

After the r.f. circuits are aligned the local oscillator injection should be re-checked, as adjustment of the tuned circuits, particularly the one in the mixer grid, will usually change the amount of injection bias observed at the test point.

## IF. CIRCUITS

If necessary, the i.f. circuits of the converter can be adjusted without connecting the converter to a communication receiver. To do this, terminate the converter output with a resistance equal to the impedance of the line used between the converter and the receiver. Connect the r.f. probe of the v.t.v.m. across this resistor. With the converter operating normally, use the g.d.o. as a signal generator in the manner outlined for r.f. bandpass adjustment. While slowly tuning the g.d.o. across the r.f. passband, adjust the i.f. circuits to give the desired response.

In making these adjustments, be sure that the g.d.o. output does not saturate the converter. If the converter output is too low to give a usable indication by this method, or if a v.t.v.m. is not available, the converter will have to be connected to a receiver and the S meter used as an output indicator.

## NOISE FIGURE ADJUSTMENTS

It cannot be too strongly emphasised that the simplest, easiest and most accurate method of realising the ultimate sensitivity of a v.h.f. converter is the use of a noise generator. If you do not already have one of these handy devices, it will pay you to stop at this point and build one. Several excellent noise generator designs have appeared in "QST", and even the simplest—the crystal diode type—is a highly useful tool.<sup>1</sup>

An accessory to the noise generator is a good audio voltmeter. The a.c. scales of a v.t.v.m. can be used, but these are generally peak indicating devices, and because of the character of the receiver noise the needle will bounce in an annoying fashion. Ideally, a true square-law or r.m.s. detector is required. However, a satisfactory device for this service is an average type detector, with some smoothing. Such a detector, suitable for connection to a phone jack or across the speaker terminals, is shown in Fig. 3. The transformer used in the detector is not critical. The one used had a 400-ohm primary and a 2000-ohm secondary. Some of the small transistor audio transformers on the market work very well. Popular types of volt-ohmmeters have average-type rectifiers for use on their audio output scales. These are satisfactory for use as audio indicators in noise generator work.

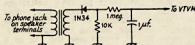


Fig. 3—An audio detector arrangement for use in making noise-figure measurements.

In making noise generator tests it is important that the a.v.c. be disabled, and that both the audio and r.f. gain controls be set so that there is no tendency to saturate. Generally speaking, the audio gain should be run at a fairly high setting, and the r.f. gain should be turned up only to the point that will give a usable indication on the output indicator. The b.f.o. may be on or off, but all tests should be made with it in the position in which the work was started. The same may be said of the noise limiter. If you are

working in a completely quiet location the limiter should be left off, but more reliable results can be obtained in noisy locations if the limiter is used. A moderate amount of noise limiting will have no effect on the accuracy of noise generator measurements, provided that the setting of the limiter is not changed during the work.

With the noise generator connected, but turned off, set the audio and r.f. gain controls as described above to give any convenient reference reading on the output indicator. Now turn on the noise generator and adjust its output to give a 3 db. increase in the output indication. Unless you have a db. scale, this will require an increase of 1.414 times. Adjustments should now be made on the converter to see if the 3 db. increase in noise indication can be obtained at a lower setting of the noise generator. Any adjustment that works in this direction has improved (lowered) the receiver noise figure.

In converters having one or more r.f. stages, adjustment of the mixer should have no effect on the noise figure, except in the case of very large changes in settings. The gain and output may vary considerably as circuits are adjusted, or the injection level is changed, but the noise figure should remain the same. If small changes in mixer adjustment do affect the noise figure, it is proof that the r.f. portion of the converter is not working as it should.

Except in the case of the plate circuit of a first grounded-grid r.f. amplifier, adjustment of circuits other than the input circuit and the neutralisation of the first stage will have little or no effect on the noise figure. This holds so long as the gain of the first stage is sufficient to suppress noise contributions of succeeding stages. The neutralisation of the first stage and the adjustment of the input circuit will have little effect on the over-all response of the converter, so the passband adjustments outlined earlier can be done first. They will require only minor touching up, if anything at all, when the noise figure has been adjusted to optimum. Do not be surprised if lowest noise figure is obtained at settings of the first circuit that result in somewhat less than maximum gain. This effect is to be expected in circuits using neutralised triodes, particularly. In these, the loading and tuning the input circuit for best noise figure will not coincide with maximum gain setting of this circuit.

In some cases it may be noticed that the r.f. stages tend to oscillate when the converter input is not loaded properly. This is usually an indication of imperfect neutralisation of the first stage, but if the antenna circuit is properly matched to its transmission line, and the coupling to the input circuit is adjusted for best noise figure, oscillation with the antenna removed may not be harmful. If the antenna system has a high standing-wave ratio, however, more careful neutralisation may be necessary to achieve satisfactory performance and freedom from oscillation. If extensive work is to be done using a poorly matched antenna system, it may be advisable to adjust the converter input circuit for that antenna. This can only

(Continued on Page 15)



# FREEDOM OF THE AIR!

## CONFESSION OF A CONVERT

S. G. MERCER, G2DPY

This is, in its way, as important as any technical or DX operating article ever published in "Short Wave Magazine." All who take Amateur Radio seriously, or perhaps too seriously, should read it—and break their own shackles.—Editor.

It suddenly came to me that I did not at that moment know what to do with myself! Since 1948 this situation had never arisen and it warranted, I felt, some serious introspection. The time was 0900—on 21 Mc. I had heard some really good Pacific DX coming through, and on 14 Mc. the conditions were similar. I had, under my control, 100 watts of phone or c.w. efficiently channelled into a DX aerial system. The receiver was well proven. Absolutely nothing to stop me spending an hour or two with my hitherto all-absorbing DX'ing. But the inclination was just not there!

Ten years. What was there to show for it? I tried to catalogue my thoughts into sensible order. Yes—about 400 square feet of roof space packed with "unmissable bargains"; half-completed rigs; completed rigs that just never turned out as expected; pieces of gear that were of little use when originally acquired, and of still less use to anyone now in any conceivable event. In fact, about £50 worth—well, worth? No, a better description would be, "original cost" of sundry equipment that would (and might as well) lie up among the rafters for ever and a day.

My eyes and thoughts then turned to the unsightly stack of large cardboard boxes containing some fifteen thousand cards from all over the world. Surely these would arouse some enthusiasm—but no, they merely brought to mind laborious "catching up," frenzied posting and the artifices that went into obtaining some of the rare ones. Two hundred odd countries confirmed these cards for DXCC on four bands. Cards for W.A.Z., A.B.C., D.E.F., G.H.K., etc., etc.—heck, what did it mean to me! Who looked at them? Over the past ten years not more than a dozen people had ever professed any real interest in them. My fellow-Amateurs were either secretly contemptuous or envious, according to their status, when they saw them. In fact, a huge heap of pretty postcards would now become so out of hand that they were not even in any kind of order or system, being heaped any-old-how into those ugly cardboard boxes. No doubt the best thing would be to stow them away in the roof for some years until the children grew up, when they could re-discover them and remove the stamps.

Now—to look with new vision out of the window that has shed light on my operating table for so long. A rotary beam for ten metres sitting on a shaky pole; two equally shaky 40-foot masts; a mass of wires spewing across the back garden, so numerous that even now I had to stop and think what purpose each snarling tendon served.

### REALISATION—

My eyes shut in inward reflection on other things. My three boys. "Dad, come and show me how to get this tyre on." "Hey, Dad, coming down for a swim?" "Dad, the circus is here today; Mummy says we can go if you will take us." Horror! To think of all the simple childlike requests that I had answered with a snorted "Shurrup! I am listening to someone," or some similar abrupt refusal. I could not imagine how the children could even bother to speak to me now, after such treatment that had been handed out to them. The XYL. However could I have thought that bringing her in on a distant phone contact could compensate for the once-weekly visit to the cinema or theatre we used to have. When had I in recent years ever got the family together and said, "Away we go today for a real day out together?"

What had happened to my sense of values? I saw, for the first time in years, the river meandering its leisurely course outside my window, with all the wild life on it. The untruffled water shone with invitation. Things that had for a long time escaped my observation. Just then, Betty looked in at the door of the radio room; I noticed the desperate look of resignation on her face after confirming that I was in the usual position! I took in the dilapidated appearance of the paper, ceilings, paint—all neglected responsibilities. The children came in, not even bothering to look in to see me, to see hello. What was the use when they would at most be rewarded with a grunt!

The savoury breakfast aroma from the kitchen stirred new life in me and—I had an appetite! I had not regarded meal-times for years as anything but a darned nuisance that interfered with my QSOs.

I had awakened to the realisation that a complete revision of my life was necessary. First, I would keep the rig on the air and use it only on such occasions when it was not going to interfere with any other person's activities. I would not get hot under the collar any more, whether or not there was some expedition belting through at S8, or even S2! I would use the rig in a friendly manner and cultivate some of those chaps that I had brushed off with "Won't hold u nw om—cul 73 VA." Betty would be taken out at least once a week, with no strings! All reasonable requests from the boys would be dealt with; I would see them to bed each night, with a fatherly word. I would take walks with the family, or by myself, and catch up with things that I had almost forgotten. I would reply to QSLs as a courtesy but otherwise would not send them out. I would be content with modest power and a less all-embracing and unsightly aerial system. In short, I would make my hobby into a hobby and not an all-enveloping, inconsiderate tyrant.

### —AND THE RESULT

These were my thoughts, and what, might you ask, actually came out of it all? I will tell you.

I now have a medium-powered rig and a medium-sized aerial system. I go on the air during some weeks as much as twelve hours; other weeks not at all. In the summer my main activities are out of doors and time spent on the air is correspondingly reduced. I reply to cards received but do not send them unless requested. (There must be thousands who, though they may or may not admit it, kept going a QSL system similar to that which I maintained and which involved many people in extra work and expense absolutely unnecessarily.) When the gales lash around my garden I do not have to rush out trying to save over-ambitious masts. The house is tidier and cleaner. I have found that the children are really good lads who do appreciate having Dad around sometimes. My XYL appears as a new woman and is still wondering whatever suddenly happened! I enjoy my home, my hobby and life in general.

The moral is obvious: Do not let yourself become a slave to your hobby. This Amateur Radio is the grandest spare-time occupation that has ever been known. Keep it like that. Treat it with consideration and take it in doses that will not draw you too much out of ordinary everyday life, and it (and you) will be the more appreciated. It nearly made me into an "eccentric," to say the least.

I hope that these reflections will make some who read them think a little and realise that there is a big world outside Amateur Radio worthy of attention, and that there are people round you who are not interested in it. The watchword, as in most things, is—**Moderation.**

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All entries to be forwarded to the Federal Secretary, Box 2611W, G.P.O., Melbourne, C.I, Vic.

Be in it. Your idea might be worth £5!

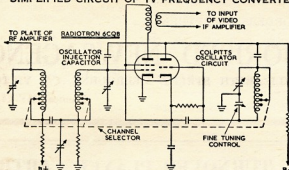
# RADIOTRON TELEVISION VALVE SERIES

## Frequency Converters & IF Amplifiers for TV Receivers

The desirable requirements for TV frequency converters and if amplifiers can be summarised as follows:—

- transconductance should be high to provide as much gain as possible in the low-impedance, wide-band circuits used in a TV receiver.
- the equivalent noise resistance should be low for good signal to noise ratio in the frequency converter stage.
- there should be little feed-through from the oscillator to the rf stage to keep the oscillator radiation to a minimum.
- the oscillator section of the converter should have good frequency stability, and possess characteristics which make oscillation of the right amplitude easy to obtain.
- the application of a variable control voltage to the grid should not have any appreciable effect on the input impedance to the valve when used as an if amplifier.

### SIMPLIFIED CIRCUIT OF TV FREQUENCY CONVERTER



Theory predicts that the higher the transconductance ( $g_m$ ) and the sharper the cutoff characteristic in the mixer section of a converter, the higher will be the conversion transconductance ( $g_c$ ). The lower the bias required for plate current cutoff, the smaller the oscillator injection voltage that is required for maximum  $g_c$  and hence the lower is the oscillation radiation. Multigrid types of converters, i.e. those in which the signal and oscillator voltages are applied to separate grids, can be shown to be noisier and to have lower  $g_c$  at high frequencies than the types in which both voltages are applied to the one grid.

For the oscillator the most satisfactory operation is obtained by using a triode of high  $g_m$  and medium amplification factor ( $\mu$ ) in a circuit which will provide good frequency stability. The Colpitts type is often used for this purpose.

The series connection of the oscillator and mixer sections of the converter across the B+ supply offers the advantages of a reduction in current drain and more constant oscillator injection over the frequency range, due to the current-stabilising effect of this type of connection.

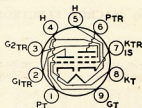
To maintain a desired relationship between transconductance and input impedance for valves used in the gain controlled stages of if amplifiers an unbypassed cathode resistor is commonly used; the use in if amplifiers of valves with internally-connected suppressors then presents difficulties in obtaining satisfactory stability. Valves featuring a tetrode construction avoid this complication.

The Radiotron 6CQ8, which has been especially designed to meet the requirements mentioned above, features a plate current characteristic with a sharp knee at relatively low plate voltages and mixer operation with good linearity in the frequency converter stage in the TV receiver. The tetrode construction of the 6CQ8 avoids the difficulties in stability outlined above, and together with the other characteristics of this valve, allows high performance to be obtained as a TV if amplifier. The tetrode section is also suitable for use as a sound if amplifier and agc amplifier. The triode is suitable for use as a sync. separator and af amplifier, and as an af output stage where only moderate output is required. The triode may also be used as a cathode follower driven by the tetrode section in the video amplifier stage.



## 6CQ8

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Bottom View



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- PIN 5: HEATER
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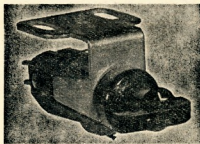
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## MEET THE OTHER AMATEUR AND HIS STATION

### BILL HEHIR\* VK3RE

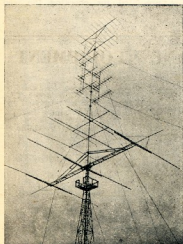
**Y**OU can tell Bill Hehir (VK3RE, Hamilton) is a Radio Ham a mile away—you cannot miss those towering beams atop his house which soar 105 feet.

And they're all his own work. "Just pushed them up," he'll tell you modestly. "Built them in my lounge room"—and he did!

He built the lounge room, too. In fact Bill, a radio and t.v. engineer in Hamilton, built his whole house—32 squares in 12,000 hours.

And he was one Radio Ham who made sure he'd have his own radio room—he built his home AROUND his radio gear.

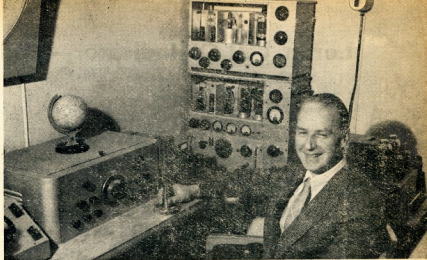
There wasn't a word of complaint from his wife, Sheila, either. "Bill was so keen on radio that there was only one thing for me to do—get interested in it myself." And she has—in fact she spends a lot of her time speaking over the air to friends in America.



Bill got his licence in 1934 and has lived in Hamilton for the past 10 years. Before that he flew more than 4,000 hours with Ansett Airways.

Bill even went to the trouble to build his own 21-tube double conversion f.m./a.m. receiver. His transmitters (see picture) are a pair of 211s in push-pull for 80, 40 and 20, and a 813 for 10 and 15 metres. Both his transmitters are modulated by a pair of 25-year-old 2443Ns in class AB2. The maximum voltage Bill uses in the shack is 600 volts, with selenium rectifiers throughout.

\* Kent Road, Hamilton, Vic.



The 105 foot beam which towers over Bill's home consists of 3 element wide spaced beams on 20, 15 and 10, with a 40 metre dipole running along the 20 metre beam boom. As Hamilton is 200 air miles from Melbourne t.v. towers, Bill has erected above his Ham beams a 78 element antenna for Channels 7 and 9 and a 22 element for Channel 2.

For his Hi-Fi equipment the loud speaker console contains nine speakers—four for the lower tones, four for the middle register, and one tweeter.

Bill must be at least one of the hamiest hams that am.

From Nell Town (VK3ANK), who called on Bill passing through Hamilton recently

## ADJUSTMENT PROCEDURES FOR V.H.F. CONVERTERS

(Continued from Page 11)

be done by listening to a signal, with the antenna connected, in the manner recently outlined by W8WXY<sup>3</sup>.

The importance of fairly high r.f. skirt selectivity in achieving accurate noise figure readings is not generally appreciated. If the converter passband includes portions of the image frequencies (which may easily happen when a low i.f. is used) the indicated noise figure will be lower than the true noise figure of the converter and actual receiver performance will be degraded.<sup>4</sup> Thus, particularly where double-tuned circuits are used, it is desirable to make at least preliminary adjustment of the converter passband, as already described, before attempting noise figure work.

As a final step, the r.f. and i.f. pass-band adjustments can be gone over, as minor changes will have no effect on the noise figure, so long as the first stage circuits are not altered. If the converter has an i.f. gain control it should be set so that the converter adds 10 to 20 db. of noise to the receiver output over that with the converter turned off.

The work on the converter will then be completed, and the experimenter can rest assured that he has made his handiwork perform to the fullest extent of its capabilities. It is hoped that the measures detailed here will help many workers in the v.h.f. field to achieve better over-all receiving results, and more important, to develop a better feel for the adjustment of their equipment.

<sup>3</sup> Burson, "Hints on 144 Mc. Converter Design and Adjustment", "QST", July 1958, p. 41.

<sup>4</sup> Weeks, "Image Ratio and Noise Figure" (Technical Correspondence), "QST", February 1958, p. 132.

## 50 Mc. W.A.S.

Call	Cer. Add. No. Cntr.	Call	Cer. Add. No. Cntr.
VK3WJ	12 4	VK2AEZ	10 1
VK3PG	5 3	VK3XA	11 1
VK3YW	2 3	VK3CM	12 1
VK4RY	2 2	VK3ACL	14 1
VK4HR	4 2	VK3ZD	16 1
VK3LC	1 1	VK3HO	17 1
VK6DW	3 1	VK2ABC	8
VK3RR	6 1	VK2BC	15
VK3HT	7 1		

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# Loran C.R.O. Indicator—Model AN/APN-4

J. J. KELLEHER,\* VK3ZAJ

**A** LARGE quantity of these instruments is available from disposals sources and when modified have many uses around the Ham shack. The following notes and the circuit have been extracted from "Loran, Long Range Navigation," by Pierce McKenzie and Woodward.

The notes have been abridged to give the details of the operation of the instrument as received, and it is hoped that these notes, along with the circuit diagram, will supply the essential details to establish a starting point from which conversion to some other type of instrument may be commenced.

This model has been produced in greater quantity and was more extensively used during World War II. than any other Loran equipment.

The indicator consists of the crystal oscillator, dividers, delay and deflecting circuits for the 5 inch cathode ray tube.

## FUNCTIONAL DESCRIPTION

There are six dividers, the maximum dividing ratio is 5:1. The output pulse from the last divider is fed back to the second and third dividers to control the specific recurrence rate.

\* 3 Paine Street, Newport, W.15, Vic.

Pulses derived from the crystal oscillator and from the first, third and fourth dividers are mixed and applied to the vertical plate (along with the trace separation and pedestals) of the cathode ray tube as calibration markers at time intervals of 10, 50, 500 and 2,500  $\mu$ sec.

The complete schematic diagrams of the Indicator are shown on the opposite page.

## MANIPULATION

In making a time difference measurement, the operator must manipulate the r.f. channel, basic P.R.R. and selector switches, the gain, amplitude, balance and frequency controls, the left-right and sweep speed switches, the coarse and fine B—delay controls as well as the usual oscilloscope controls.

When the slow trace oscilloscope pattern is displayed the left-right moves the signals rapidly along the trace by momentarily changing the feed back. When one of the fast trace patterns is displayed the switch moves the signals slowly by changing the oscillator frequency.

The eight-position sweep speed switch is so designed that in making a time difference measurement the operator rotates the switch in numerical sequence from position 1 to 7.

The first four positions show the received signals and are used for positioning and matching the signals. On the first position the normal slow trace pattern is displayed.

The patterns of the second and third positions are fast traces of 750  $\mu$ sec. and 200  $\mu$ sec. respectively.

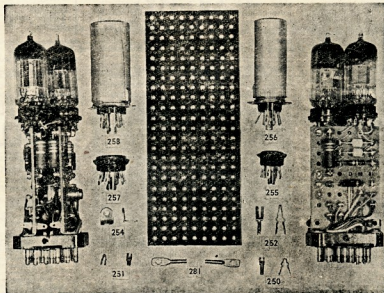
For the final matching of the pulses the separation of the 200  $\mu$ sec. traces is eliminated in position 4.

Positions 5, 6 and 7 are used for measuring the time difference between the received signals. For this purpose 10, 50, 500 and 2,500  $\mu$ sec. calibration markers are displayed on these three positions.

The pattern on position 5 is two 200  $\mu$ sec. traces with markers; on position 6 it is two 750  $\mu$ sec. traces with markers, and on position 7 it is two slow traces with pedestals and markers. On position 8, two 200  $\mu$ sec. traces with stair-step pattern of the third divider are presented for checking the feed back.

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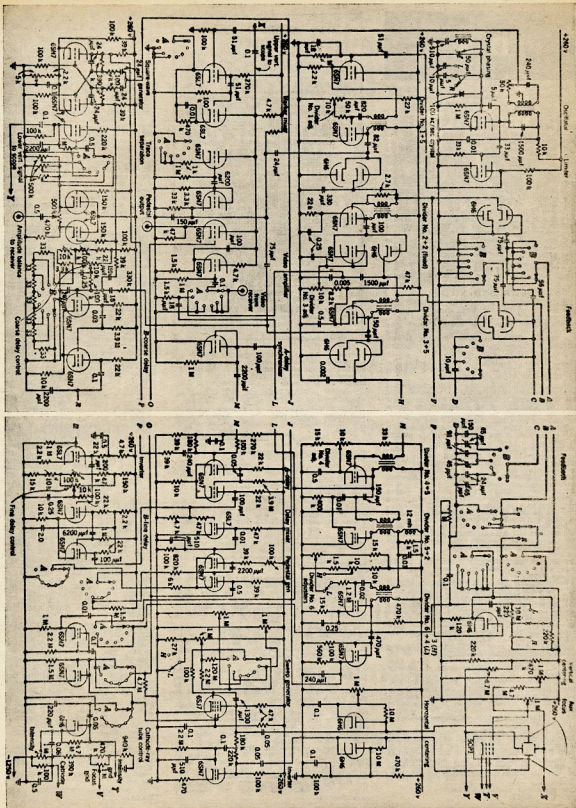
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Schematic diagram of Loran C.R.O. Indicator—Model AN/APN-4.





## QTH: YOU MAY NEED

LX1T—Echt-Sur-Alzette, Luxembourg.  
 7J1AL—L. L. House, 49 W.A.C. there is  
 ZS1E—Via W6CIN, Clifford Swann, Jr., 1617  
 Woodbine Ave., Charleston, Virginia.  
 EA3CP—Aguin Perez, y Perez, P.O. Box 215,  
 San Cruz de Tenerife, Canary Island.  
 CE1ZG—P.O. Box 3016, Valparaiso, Chile,  
 South America.  
 CE1AC—Faisal T. CE1HL, Box 5050,  
 Santiago, Chile, South America.  
 CE1ZF—Sergio Rosa R. CE1BM, Via Juan Fernan-  
 dino, Chile, South America.  
 SV0WE—Henry B. Wood, Box 564, Athens,  
 Greece.  
 ZD7SP—George, Post Office, St. Helena Island.  
 SU1M—Melrose, Nr. 13, Kawa Sir. Zaber,  
 Cairo, Egypt.  
 ZS8RP/T—Des, Ubombo Ranches, Swaziland  
 (4D0).  
 ISAAW—Caslo, Box 83, Magadiscio (4D0).  
 ET1VB—Von, Asmara (via ET2US, A.P.O. 843,  
 N.Y.).  
 ST3KO—QSL via R.S.G.B.  
 Ray Bato, VK1ANB, formerly VR3A, hopes  
 to be operating on full power from his new  
 QTH at St. Ives early in 1959.

## QSL DETAILS

2AMB: CN8IF, LX2GH, QO5EH, UR2BU,  
 VP5YG, VP2VY, VS8MI, XH1, ZSLX, ZL4CZ,  
 4QF1I, 4QF1J, 4QF1K, 4QF1L, 4QF1M, 4QF1N,  
 VP2DG, VP3VY, ZD1FG, 3A0M: K1ERR, VO1,  
 OA1S, VY5ADP, BE1S19: CT2AI, HA1KSA,  
 HB1LO, HC4IM, ISAAW, ZK1AC.  
 In this first effort my thanks go to W4VXV  
 for the use of his valuable DX Bulletin, 2QI  
 for his long list of stations worked, and other  
 valuable help. I appreciate your sincere  
 wishes, George, and will be looking for  
 your support each month; 2AMB, it was good  
 to contact you over the air again and will be  
 looking for you each month; 4D0, thanks for  
 the list and New Year greetings; 3MY, your  
 effort is welcome and hope you get that UP2  
 very soon; BE1S19, I hear the good ones, yes  
 Eric you have certainly been an active s.w.l.  
 for many years and your comments and notes  
 will be so hot, but I hope W1A-12001 you  
 have some good ones in your list this month; W1A-  
 12022, it seems your 455 worked well on your  
 trip through VK land; W1A-12065, keep up  
 the good work, Ian, and that tally of 45  
 countries will continue to grow.

— — — — —

## CORRESPONDENCE

Any opinion expressed under this heading is the  
 individual opinion of the writer and does not  
 necessarily coincide with that of the publishers.

### "WHAT'S WRONG WITH 40"

Editor "A.R.," Dear Sir,  
 Well I suppose that by now you have thought  
 of a good answer, all of which, with a few  
 appropriate adjectives, will end in "no DX,"  
 "noisy," "QRM," or "QRN."

No matter what we think, the fact remains  
 that it is one of our bands and a very shaky  
 one too, with all the commercials cutting in  
 and out, and the number of DXers who are  
 envious eyes on it. It seems queer that with  
 all this talk of fighting to retain our bands  
 a few more people won't do the job more  
 practical by actually using them occasionally.

Having been a Ham since 1936, originally  
 A2JC, I remember the old days when we had  
 to battle the QRM on 40 and 40 was really  
 wanted to have any contacts and I suppose  
 that is one of the reasons for my affectionate  
 regard for these bands.

With the exception of a few years break at  
 Woomera I have been on 40 continuously since  
 1946 and must admit that it has provided all  
 the fun that I want.

Now for those boys who say the old band  
 is dead. Let's see what a bit of battling with  
 35 watts can do—63 countries, U.S.A. W.A.S.,  
 W.A.C. Now I will admit that this doesn't  
 look so hot, but it took me 2,000 W contacts  
 to finally land that North Dakota for the W.A.S.

Working six or seven Ws a night isn't every-  
 one's idea of DX, but we ought to think that  
 there are thousands of Hams on 40 who get  
 up early in the morning and who consider VK  
 as real DX—the number of cards drawing  
 attention to "1st VK contact" bears this out.

Don't get me wrong by thinking that all  
 the Ws on 40 are newcomers, else you will  
 get a shock when you hear the number of  
 big "DX" men who come on when the higher  
 frequencies go dead. As for poor signals, well  
 haven't heard one on 30 yet who equals  
 W4FQX who uses a 2 element beam and comes  
 through like a local. W2BVN, WB1HW, W9U1

and a host of others put in S8 to S9 signals  
 around about 9 p.m. in summer.  
 For those who want 40 W.A.C. there is  
 HC4IM on a few nights a week with his S7  
 signal and "sure fire" air mail QSL.  
 Admittedly the band has commercial QRM  
 but by 1959 standards we should be able to  
 work very close and it can be done. In the  
 recent "CQ" Contest, TI, Dave Williams, was  
 worked on the Saturday night and 31 on the  
 Sunday night and they included G8, VU, VR,  
 KL7, VE, KRW, WJ, which isn't bad going  
 for a poor band.

A sked is kept every Sunday and Monday  
 morning with W4FQX and W2BVN at 6 a.m.  
 Additive time (2030 GMT) and it does the heart  
 good to hear those boys coming through S6 on  
 the "long path".

Some DX worked lately includes, in addition  
 to the above, UA0, HC, KX6, TI and new ones  
 keep on popping up, which makes that "40  
 DXCC" just a little closer.

From the foregoing remarks I hope to have  
 proved that the old band still has a kick and  
 there would be still more DX but you can't  
 blame that VU not calling CQ when there is  
 no one there to answer him—I know, because  
 morning after morning I am listening at 6 a.m.  
 for those, at the present, elusive Europeans.

Well chaps, there's the story and let's try  
 and give the old bands one or two nights a  
 week and prove they are worth keeping. I'll  
 guarantee you will get a kick out of it.

—E. J. (Ted) Cawthron, VK5JE.

## VK-ZL Contest

Editor "A.R.," Dear Sir,

It has been suggested to me that I would  
 possibly like to clarify my remarks in Jan.  
 "A.R." in reference to the 1958 VK-ZL Contest.  
 Let me point out from the start that no  
 reference has been made to our Federal Con-  
 test Committee, either direct or by implication,  
 other than to state that the matter "is now in  
 their hands".

When I first queried the rules, I wrote to  
 the Sec. of the N.S.W. Div. asking his opinion  
 on the matter, however if I remember correctly  
 there were other letters in the matter and  
 Norm has possibly overlooked it. Rather than  
 worry Norm over matters which do not concern  
 him, I wrote to the Sec. of the Federal  
 Contest Committee, Mr. Reg. Harris, VK8IR,  
 and as time was getting short, I addressed it  
 to his home QTH. Apparently it got lost in  
 the process, or I was incorrect in writing direct  
 to this gentleman—the latter no doubt. I  
 have been a member for just over a year and

## CHANGE OF ADDRESS

W.I.A. members are requested  
 to promptly notify any change of  
 address to their Divisional Sec-  
 retary, not direct to "Amateur  
 Radio."

still have not got things set out properly as  
 yet). In any case, neither of these letters were  
 answered or if so I did not receive them. It  
 was at that stage that the Contest was held.  
 I do not recall the dates of these two letters,  
 other than the last was sent just about 10 days  
 prior to the Contest. I then wrote to the  
 N.Z.A.R.T. and received the fatal letter, which  
 as mentioned last month is now in the hands  
 of the VK2 S.w.I. Group.

It appears that my letter last month has  
 offended the F.C.C. I am very sorry about  
 this and do hereby apologise for any statement  
 which is contained in that letter which could  
 cause any embarrassment to the F.C.C. or any  
 other person, nor was it an attack on that  
 body.

It was written to bring to light a misunder-  
 standing which has doubt caused some  
 confusion. Two facts point out clearly, firstly,  
 the rules as stated in "A.R." permitted VKs  
 and ZLs to log each other, while a letter from  
 the N.Z.A.R.T. states clearly they cannot. This  
 is the issue in hand, and it cannot be brushed  
 aside. Since the F.C.C. have seen fit to take  
 me to task about it, I will hereby ask them to  
 publish through these columns, the reason for  
 this error. For there can be no doubt that  
 somebody has made a mistake. A lot of  
 fuss about nothing? Well, maybe, maybe not.  
 Depends how the individual views such mat-  
 ters. Any s.w.l. who goes to the trouble of  
 entering a contest must take it seriously, and  
 I would take this opportunity of pointing out  
 that there would be an outcry if a similar  
 condition affected the Transient section.

I have honestly attempted to explain my  
 previous letter. I have apologised to the F.C.C.  
 for any damage I may have done them, to the  
 N.Z.A.R.T. there was no intention to cause  
 any embarrassment, and I am sorry if I have  
 caused any. I only ask that an oversight of  
 this nature does not occur again. I trust  
 there are no more hurt feelings over the mat-  
 ter, as it is the least of my intentions to dis-  
 rupt the workings of our association and will  
 again point out that my letter was written  
 mainly to have the matter cleared up for  
 future contests, to a lesser degree to in-  
 form the s.w.l.s. in general of the situation.

—Don Grantley, W1A-12022.

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## NOTES

### NEW SOUTH WALES

#### HUNTER BRANCH

The last Branch meeting for 1958 was held at the University on Dec. 11, on Dec. 12 when the following were present to hear and see Joe 2JR perform: 2CS, 2ZDL, 2RU, 2AQR, 2ZDF, 2SF, 2AOR, 2ADS, 2AT, 2AAS, 2QB, 2ZAF, 2ALA, 2RU, 2ZCA, Messrs. Sutcliffe, Land, Hall, Rugg, Roberts, Grey, Stobbs, Jackson, MacLaughlin and Brooks. The writer was disappointed at the brief discourse by Joe as he fully expected Bob Winch's record to be broken, but apparently Joe was hungry and heard of the excellent supper that was to be served later. Anyway, the bits and pieces appended included hints and kinks on the BC21; how to pin-point piccolo pete; and excellent slides of the Brussels Exposition were well received.

Bill ZZL was about to protest when Joe said that there was hum on the signals broadcast by many English butcher-shops, but with all his Aldermanic guile he put on slides of traction engines and all was forgiven.

Was surprised by the absence of Gordon 3CI, thought he would be there to see his old partner in photographic crime, but maybe he was away peddling pills or perhaps printing snaps he took at Blackalls two years ago. Must get Gordon and Joe to give a lecture on how to keep the road accident rate down. My spy tells me that Bill 2XT wasn't satisfied with the gear he got from East Coast, so he commissioned Alan 2FH to journey forth to Fiji to see what he can pick up in that direction (kimono to grass-skirt).

Wal 2AXH will be home long before this appears in print and all his friends are anxious to hear all about his trip to the shakies. My spy also tells me that Rodney 3CN is signing up for the East Coast, but when. Congrats to John 2JU on his appointment as our I.T.U. Rep., so now you legends, your last exorcism has disappeared. Don't you give a Quid (quotation by kind permission of Pop 2AHL).

Well, chaps, your next meeting at the University is on Friday, Feb. 13, at 8 p.m. Make a point of being there, as the 1959 programme has been mapped out for this year with quite a few southern importations. See you all also at the social gathering at 2XT, Bill's, home, on the 25th.

#### BLUE MOUNTAINS SECTION

The Dec. meeting was held on 19th at Springwood R.S.L. Hall and was a rather special meeting as the festive season drew near. Present were 2MZ, 2QA, 2ASZ, 2AVK, 2ADF, 2RM, 2BK, 2AL, Messrs. Pridgen, Milley, Boyd, Gunning, Snell and Russell. Business was held to a minimum and consisted mainly of discussing plans for moving the Section meeting place to new quarters in the new Council Chambers. The Jan. meeting will be held there and we should have 80 and 40 mx equipment operating that night followed by 5 and 2 mx equipment at an early date to tie in with W.I.C.E.N. Plans are afoot to hold more classes and lectures for those attending holders of the A.O.C.P. in the Group.

Construction is well under way on 2 mx converters for those members who do not already possess one, by Wal 2MZ and his willing assistants and rampsies were on display which were studied by all.

A very appetising pre-Xmas spread was turned on by Syd 2AVK and Norm 2QA and the Section funds suffered a large blow at the local hostelry which provided adequate liquor refreshment. It was pleasing to note that at the wind-up of proceedings all 80's had been fully neutralised and no splatter was left for the mice.

Activities of the members have been a little hard to trace this month due to the festive season disrupting consistent QSOs. Bill 2HZ and several other members have been on holidays and have not been heard on the bands. Wal 2MZ has been very active on 6 mx during the Ross Hill Contest with a 3 el. beam and 522. He thumps a very solid signal

into this QTH on that band and is knocking ZLs over right and left. Don't need a mast on top of your mountain, eh Wal?

Syd 2AVK has been heard actively on this band also but battling the Tennessee Valley Indians a little on the first 40 mhz are. Yours truly is slowly getting started also and if this new 4 el. yagi works out like I hope, it will be heard later, too, shortly.

Dave 2NK and Keith 2ADK have been busy installing gear at Lawson for the clubrooms and that is possibly why I haven't heard them much this month. Don 2ART appears to have temporarily deserted c.w. on 40 now and is putting out some nice phone there. Norm 2QA has been heard on 2 mx regularly and must be deciding that a xtal on 40 is hard yakkas indeed.

Jack 2ADF is constructing a very nice rack to hold Geico and 807 final at Penrith, O.C. the air tests believed successful so after a long absence should be active soon. 2 mx equipment also under way at his QTH. Heard Wal and John Ferris discussing plans for a fishing trip northwards with Horrie 2HL so wish them all the best. Should know by next month's meeting if any results. John Snell, having acquired a new car, is busy building mobile 40 and 2 mx rx's into it so should be a good starter for 40 hunts soon.

Would like to advise all members that a visitor at the Feb. meeting will be the Blue Mountains C.D.E.N. Officer, Colonel Strachan, to advise how we can assist in emergency communication, so I would ask all possible to attend this important meeting at Lawson on 20th Feb. 73 2ASZ. . . .

### VICTORIA

During this time of the year when people are away on leave and there is no general meeting, news is rather hard to come by, so please excuse the brevity of these notes.

I don't know whether I am suffering from imagination or not, but it seems to me that there is a lot more portable and mobile activity on the bands these holidays than there has been of recent years. Perhaps we can expect a renewed interest in this type of operation in the future. Surprisingly enough a large proportion of the stations noted were using quite low power, mostly between 5 and 10 watts and one or two were even lower than this. Despite the QRP and whip antennae and the like, signal strengths and quality were generally very good so it is hoped that the operators will be encouraged to enter the National Field Day which will be over by the time these notes are in print. Incidentally, at this stage, the Publications Committee intends to enter a station in the field day and it is hoped that present plans will bear fruit.

No doubt the thought uppermost in most of our minds at the moment is the state of progress with regard to occupation of the new building. As some of you will have heard via

the broadcasts and grape vine, the formalities of the purchase are now well and truly completed and the plans for our occupation of the building are well advanced. There is more to this shifting in business, of course, than meets the eye and it may be late February before any semblance of order will start to emerge from the dust of battle. The first of the jobs associated with the shift started in mid February and it is hoped to retain the Queen Street premises until everything is ready at the new abode to avoid the inevitable pile ups that result from a hurried shift.

President Fred has the organisation of the shift well in hand and intends to give us a full report of progress at the February meeting. Members will also be given the opportunity for a general discussion on the building project and members of the Building Committee will be on deck to answer questions. By the date of the meeting the arrangements for financing our building should be pretty well in shape and members will be given details of the proposals.

Our President has been busy getting the new transmitters into shape for the new location and has run into a bit of bother with "talk back" from the modulation transformers. Apparently this was a characteristic of the BC10 and was built in to afford a rough type of monitoring under service conditions. The feature is not particularly suitable for our purposes so Fred has arranged for the transformers to be tightened and potted to see if they can be quietened down somewhat. Because of this and the necessity to build up ancillary equipment, the new transmitters may not be ready for a week or so and in the meantime it may be necessary to set up the old tx in the new building as a temporary measure to fill the gap. However, it is hoped to avoid this if possible to save the extra work. As there will be no further Sunday morning broadcasts from Queen Street, it is probable that these will be carried on from members' homes until the Victoria Street address is in operation.

In addition to the above the agenda for the February meeting includes an address from Alan Swindon, ex-V3BA5, who will give us the inside story on his sojourn in Aden, including a look-see at his equipment, so all told it promises to be a very interesting meeting.

Congratulations are offered to Bill Eutement (VK3AD), a member of the Victorian Division W.I.A., who was shown in the recent hours list as being promoted from O.B.E. to C.B.E. He is chief scientist with the Dept. of Supply.

#### WESTERN ZONE

We had a nice gathering at our Annual Convention held in the Gardens at Hornham on Dec. 14. It was a very informal gathering of the clan. There were about 20 members present, together with XLs and harmonicas, also some members of the Radio Section of the local Rural Fire Brigades.

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After enjoying a picnic lunch, we held our meeting while the women folk made a tour of the gardens. Before the meeting commenced, members stood for one minute's silence in respect of our late member, Mr. Jim Farrer, VK3DP.

New office-bearers elected were: President, Herb 3N; Vice-Presidents, Gordon 3GW and Bert 3EF; Scribe is still Secretary & Treasurer.

#### NORTH EASTERN ZONE

Xmas Day and in VK2 land way out west, sunburnt country hills looking like a rugged mountain ranges and no radio (ham) within miles. Bruce 3AGG on holiday with XYL and her niece with very strict instructions from XYL about ham gear, all to be exact. Never mind Bruce, I had a similar set of instructions and I am sorry I did not disobey them. Wonderful local DX for DX. 3ALE has at last the official word to migrate to VK4. The zone wishes you all the best and we do hope to QSO occasionally.

3KRA's XYL in car accident recently. We hope that XYL and car did not suffer very much damage and that both have been repaired. Would like to welcome to the zone 3APL of Shepparton and 3ZGR via Benalla. 3ABX is in new QTH at Mt. Beauty, while 3ARU of Smoko has a 30 mhz unmodulated. Hope you find the wog Arthur and get some DX that DX. Looking through the R.D. Contest results, I notice a disappointing number of logs from zone three to be exact. Not exactly a good representation. Let's do better next time fellows. Only thing from WYG, 5VY and 3JK, is that these boys are selling quite a bit of equipment. I hope this doesn't mean you fellows are going QRT.

3CI getting a fair share of Interstate DX on 8 mhz during recent openings. Sid welcomes Xyl contacts on 2 and 3 calls take note. 3IL, late of our zone, will be home early in the new year after a sojourn at Mawson. Doug will have quite a lot to tell for those interested.

Jim Harrington now ready for the Bushfire Net at Extra Country Fire Authority, not to be confused with the Ham net of which I haven't heard a thing, what goes on Henry 3HP? A line or two please to help a little. The Xmas spirit has caught up and I am afraid I am unable to write coherently, so see you in the new year.

#### MOORABBIN AND DISTRICT RADIO CLUB

The annual general meeting last November resulted in the following being elected to the committee: Jack Hudson (President), Bob Hall (Vice-President), Laurie (Secretary), Peter Downie (Treasurer), Ian Caporini (Asst. Sec.), Ed Manifold, Arthur Oakes and Ron Hildebrand (committee members).

It was decided not to hold a picnic this year and it was hoped that members would participate in the National Field Day instead.

We have received the very good news that the Moorabbin Council hope to make a meeting room available to us again at the Council Chambers in the near future.

A visit to the Melbourne Observatory is planned shortly and members will be notified in due course.

Our first honorary membership certificate to go to a New Zealand station was awarded to 2L1J. The rules for the award of the honorary membership certificate have been amended and brought up to date. It is hoped that the new rules will be published in "A.R." shortly.

Our last meeting for the year took the form of a Xmas Get-together at the shack of Ed. Manifold in McKinnon. Many a glass of amber and other coloured liquids was consumed and many a tall story swapped. Once again our heartfelt thanks to Ed. for making his shack available.

The club extends wishes to all readers for a happy and prosperous new year, with loads of DX!

### QUEENSLAND

#### TOWNSVILLE

The wind-up of the year's activities by the local club was a get-together at the rose garden of local carer shop, where many 80% were broken. A good time was had by all with the exception of a few who stayed at home to work DX on 10 mhz while the top notchers for this band were busily swopping tall yarns about countries that got away.

I wonder has anyone got down to analyzing the response to the L.T.U. Appeal. I for one took out the following figures: Townsville alone, 30 call signs, 11 contributed. Queensland, approx. 500 call signs listed, 113 did the right thing. No excuse as all call signs had received a card through the post. Was amazed to find some old timers who are very active fell by the wayside. This includes all contributions up to "A.R." Jan. '39.

A recent visitor to Townsville from Woomea was Jim Frost on holidays. While here he organised a moon-watch group and invited all Radio Amateurs along. Quite a large roll out resulted in Mr. Tweedie, of local astronomy group as Chairman, 3ZGR as Secretary, and Bob 4CR as Communications Officer, all other Amateurs to help out as required. Nothing being heard on 30 mhz. at time of writing of the Russian moon rocket.

Rex 4LR, who passed his entrance exams to the University, has disposed of most of his gear. Being heard on 30 mhz. at time of studies. Rex, Allan 4BE holidaying in Sydney and promises to do the shops and disposal yards over and bring back much gear. Hope the necessary db's. hold out. Vern 4LK called

in during his visit to Tville today after calling on the local Z call signs. Quite thrilled to have at last established a link on 50 Mc. between Tville and Charters Towers. Ted 4EJ holidaying at Magnetic Island, was not allowed to take any rig over there. Len 4GD and Eric 4EL ganging up on the DX on 28 Mc. Jack 4D hooked up on 15 Mc. What a surprise! Some of the locals up in arms at the audacity of a pirate in using their call signs. He will be made walk the plank if caught. The boys at the club are busy making the boys in arranging a trophy to perpetuate the memory of Andy 4BW.

I was glad when the local radio inspector called on Friday for annual inspection, as the noise level was at it worst on all bands, it being 9 plus which ever band he tuned. Have been promised a visit very shortly with the hope of attending the 30 mhz. band. Here's hoping it is found and cleared up, then my far northern boys will hear me again on 7 Mc.

Ron 3RO, ex-5RG, unable to get permission to again visit WYO, went to the other extreme and went for the heat in Port Moresby, doing a good job there helping out on the Sunday mornings with the Vids. Ron is now down to a rag-chem one of these days. Don 4PW also on holidays. While John 4FP also holidaying in N.M. was busy with the 30 mhz. band and established a four-way between Frank 4PERK, VK4DO and VK4RW. John 4QW was busy with the 30 mhz. band as well on 21 Mc. Wally 4RU almost finished rebuilding and should be on the air ere these notes appear. Anyone help with the circuit of the 30 mhz. band. 3800 Hz. Converter for 50 Mc.? Please contact 4RW.

### SOUTH AUSTRALIA

The fellowship available resulting from W.I.A. membership was clearly shown at our Christmas dinner. The 30 mhz. band was very active and came along to "talk-it-out" in a very pleasant atmosphere.

Many visitors were welcomed including Mr. Trainor and Mrs. Bredon, who met many of the gang who before were perhaps not call signs to them.

The proceedings opened with three excellent films arranged by Vice-President Lloyd and Jack Watts, which were very well received. Subjects covered being the paper pulping and manufacture industry, the newspaper publishing industry, the production of the 30 mhz. band, scientific expedition, and a highlight showing the effect of insect pest life on world food production. Some of the subjects were viewed for many a long day was seen in that film, the close-ups and magnification of the insects and their antics were spectacular to say the least.

The class was not run that night so all class members got along to meet the gang and hear how the old timers (and some not so old) talk. We were pleased to see them, too.


Joe 3JT was present, it was a pleasure to see him mixing with the youngsters. We often see him at the meetings but of course most of you know he does a lot of behind-the-scenes work in handling all the official communications.

Tom 3AQ was down from Leigh Creek, a bit irksome in collar and tie, but for all that enjoying the party in the cold south. Harvey 3HQ and Leo 3S were also giving us a hand around so you see they all came out of hiding for the Christmas "Do". One thing Council will have to consider some time is a large meeting room for the present quarters were taxed that night, and with ever growing membership, it will crop up before long.

Supper provision was by basket, Doc 3MD and his gang of superiors did the dishes and Jim 3FO with attendant waiters dispensed coke by the gallon. The head waiter and table cloth layer, Jim Paris, was, as usual, bedecked in his regular paper apron, but it was noticeable this year that the table cloth finished up with no outstanding circuits to add to the knowledge of passers-by.

Last year you might recall that Les 5AX designed his pre-amp. between a plate of buns and a bottle or two of coke.

The three musketeers, Arthur 5LQ, Lionel 5LB and Jack 5LN, were as noisy as usual, but with a little more than usual for arriving without any cigarettes, put the nips into your scribe (not Pansy this time) and smoked heavily of Gawler brand all night. Athol's 5GAZU beam is slowly taking shape, was in the pre-drawing board stage two years ago and has now reached the stage when the



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penalties are being sharpened. In the interim a rusty trusty dipole feeds the air from the shack. Many calls to Wally GAG at 80 mhz. for help, most put last month—at this stage do not know what he put in the notes—but by the look on his face, I think he might be withdrawn.

VK5 adds its congrats to F.C. for being able to get a section and a few things together. I.T.U. it's hard to think of that conference without some misgivings, so we are lucky to have someone with John's background, both commercial and amateur, to push our bows for us.

Had an interesting contact on 21 with Rob G8JH (21) recently. He is a regular, and all that he has settled down up in N.G. and looks for VK5 calls. By the way, anyone heard of CHIRP yet? I think it's a good lookout, but to date nothing heard of him here.

A few members have enquired about membership certificates not coming to hand. If you haven't received yours, I asked one from Secretary John 5JC and he will bring the matter right. A change over of Secretaries upset the smooth flow of these things.

Burnie 5WC advises the new shack in the old place or the old shack in the new place, most likely, the former, very soon. A busy bee wiring up changing over antennae, etc., all at the hottest time of the year, the cause of the new shack.

Growing interest in s.a.b. evident in VK5, a couple of newcomers in Bram 5AB and George 5ACV. I have been asked to write a column on this method. The Magazine Committee have a proposition before them of an excellent series of articles on s.a.b. that may appear, and should be how it can be done without any more headaches.

Every now and then the post session all-partyers call sign. Recently Brian 5EM announced his entry (Ardrossan) and using a Type 22 does a good job this way. I was a little surprised to find that he had then finally Joe 5JT although not a newcomer to the bands, fed 40 mhz into a 20 mhz folding dipole and made real holes in the ether. I asked him a bit about Joe to come on 40 mhz?

Joe 5JO on the bands again, very good to hear you Joe, don't overdo it, but he up and again, we like your brand of humour, of course the QSO he was in included ALQ and John 5CA. I was a bit worried about a bit mixed up with a mouthful like that?

And then that character Frank 5MZ, who, en route for VK3, dropped in at an unseemly hour and was back 5MZ. I was a bit worried about a bit mixed up with a mouthful like that? And then that character Frank 5MZ, who, en route for VK3, dropped in at an unseemly hour and was back 5MZ. I was a bit worried about a bit mixed up with a mouthful like that?

Graseme 5KV now has a rig of his own, well, nearly. The final was donated by Panay 5PS (hurray that puts him off the air—me, not Ed.), sorry it should read 5WC whilst he was the modulator. Gordon supplied (unknowning) an r.f. choke for the final, a resonant one too if you please, which was a little more than he needed. The r.f. chokes finish up. Anyway, this charity tx uses GAGT, 6A18, 6V6, 5V6, 6V8 (forget how many) and an 80 mhz. 80 mhz. in the 80 mhz. band. I don't know where they came from but they are not a class at all. Poor Panay it was c.w., hill! (That bunton will make it hard—Ed.)

An interesting note from Les 5JH, who with his new gated screen modulation in action. He has promised an article on it soon, and a note about the new rig. I think it might be a good idea to have a note about it for it contains three low-level tubes only and on his 6146 final does not need screen protection. This is quite a feature for any one who has done this. I don't know how it needs holding down in ordinary circuitry.

Have just received Jan. "A.R." and what a Panay has been doing. I think I might have to withdraw thanks. Withdraw is right. Never again, or nearly never again, why? Have six duels to fight, weapons most likely, and a bucket full of libel cases coming up.

For a long time now have been trying, and this is the first time I have been able to print the word from my scribble, the little extras that some bloke called Ed. in brackets pokes in, and now, in one spash Panay undoes me. Wait till you call CQ next Easter, I'll answer you with suppressed carrier double suppressed sidebands and a bucket full of libel cases coming up.

Council doesn't have to wear sack cloth now anyway, that was dealt with years ago when the society was in the hands of a few. I don't use the stuff. Never going near a racecourse now has improved the prosperity no end. Mr. Pincott, Sir, have nothing to do with me, know who, hope, Don't feed him sometimes.

## WESTERN AUSTRALIA

The Christmas meeting was held in the annex on the third Tuesday in December. A very large attendance was noted, including quite a few of our old timers. Wally GAG and Skipper 6WS, Skipper, who gave up operating because of blindness, is hoping to become active again. He is 86 years of age. GAG is a keen and active member, controlling 40 and 80 mhz rig. During the evening, Wally GAG showed slides of wild flowers and wall flowers. Both are very common.

Activity on 80 and 40 mhz is very low at present, not an unusual state of affairs during the summer months. During the evening, usually quite a bit of 40 mhz activity. From the experience of the writer who did the "News" for two Sundays, the session appears to be very popular, reports coming from quite a number of stations. The last Sunday in December saw the News Service broadcast to the Eastern States as six mhz was wide open at the time.

During December, Alex 6AD and Wally GAG had the pleasure of meeting Wally GAG G8JON (Neil Campbell) whose migration to Australia was aided by this Division. Alex entertained Neil and family for the day, taking them to the coast and back. Neil and family were on their journey to VK3. News has since been received that Neil lost his second son in a tragic air accident at the end of the year. We are very sorry to hear this and pass our sincere sympathy to Neil and his family.

Christmas day saw a great deal of activity on 40 mhz, when, apparently, most VK8 stations who can operate the band, took the opportunity of winning the completion of the season to fellow Amateurs. I did not log the number of stations active, but the band was reminiscent of the 40 mhz band in the States.

The 6 mhz box continue to have a good time on 50 Mc. Several very good openings have eventuated into VK3, 3, 4, 5, 7 and ZL. Most of these were worked by the 6 mhz box. 6 continues to be the most active band in VK6 with about 30 active stations. About 22 of these are listed in the 6 mhz box. I have heard from Allan 6MA, who is now resident in Childlow. Unfortunately Allan has no power and transmitters cannot be run on keroseene, so Amateur operating is impossible at present.

That's the lot for now fellers, so I will close this column, wishing you a happy and prosperous year in 1959.

## TASMANIA

### NORTHERN ZONE

The last meeting for 1958 was held at the home of our President Geoff on Friday, 12th Dec. This was our Xmas Party and meeting combined and about nine members turned up to make it a very good meeting. A vote of thanks for the excellent spread provided was passed to Mrs. Crompton.

Geoff was handed to Henry who sits for his A.O.C.P. this month and by the time this is in print we should have another VK1. I must let you into my new year resolution to get my ticket this year (I hope). So what I visited my New Year's Eve counterpart. I get my ticket this year (I hope). So what I visited my New Year's Eve counterpart. I get my ticket this year (I hope). So what I visited my New Year's Eve counterpart.

Our January meeting is to be held at George Town where we are to be the guests of George 6GC and will be held on that evening next month.

I have been having a very lazy time enjoying the holiday. I don't want to be a bit scarce I'm afraid that we will have to blame the holiday "atmosphere". Last night I was out for a walk and found my very busy with sheets of aluminium aerial poles and TUBS tuning units scattered all over the place. So I don't know if it will be too long before Terry is calling CQ.

Tonight I am travelling to Burnie where I hope to visit some of the chaps and meet them for the first time.

Well chaps, I guess that will be all for this month. I shall be back in the best in '59 for our hobby, Amateur Radio.

### NORTH WESTERN ZONE

Well chaps here we are well on the way into the new year; trust all have survived the Xmas and New Year break and are once more safely back in the shack.

Our last zone meeting was held in December but the attendance was down on the usual run. Let's make a new year's resolution to attend all meetings if at all possible. We have a large number of associate members and

it's up to licensed members to do their utmost to keep them both interested and keen with the zone.

At the meeting (the last for the old year) it was decided to hold a tx hunt on 14th Dec. The hunt was to be in two sections, the first a short run to enable all participants to turn up at the hiding place more or less together and the second a longer run. During dinner the tx was re-hidden in preparation for a second hunt in the afternoon.

It was decided not to hold the instruction night to locate owing to the fact that members being away from their usual QTH. Next meeting being a general meeting (on Feb. 3) with perhaps another tx hunt section. There was a good article on radio direction finding in the Jan. issue "A.R." so perhaps we will see some interesting activity.

Visitors, and I hope eventually members, in Geoff Sharp and Winston Nicholls, were welcomed. A much appreciated supper was served by XYLs and Max 6MX officiated as auctioneer, there not being quite the usual quantity of "junk" to be disposed of.

The tx hunt was duly held on Dec. 14. Lee TKC being the fox with his miniature rig which nevertheless put quite a healthy strain on the air. Yours truly was lucky enough to be first to locate owing to a while a couple of others (no names) had to be talked in through the agency of Dennis DTR operating from his QTH. The second run, the fox got to the final line first, followed by all other entrants in a string. Really a lovely spot on the eastern bank of the Forth River, "Fulton".

Lee TKC is in the throes of re-building and is having some fun with a v.i.o. which develops great intensity on the 40 mhz band; humorous I don't think.

Had a visit from associate David Walton (Lismore) who brought along his brother Ray (Northern Zone) "David". David is showing great promise. Hope to see some of the doings of the Northern Zone in print soon.

Adjust your social calendar chaps and keep those best Tuesdays in each month free. Do your best to attend all meetings, please.

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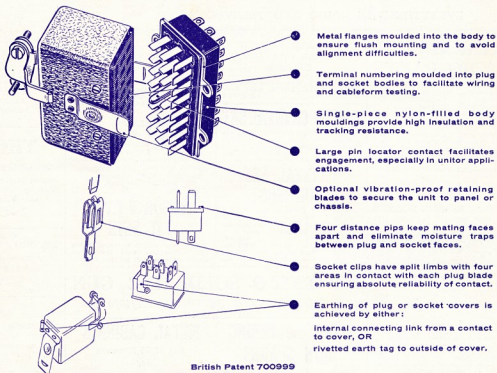
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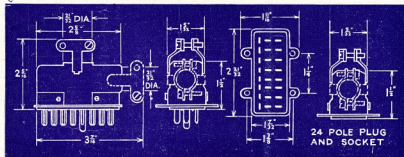
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